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**NORMAL HEMOGLOBIN VALUES FOR  
YOUNG WOMEN\***

By SR. M. ALCUIN ARENS, O.S.B., M.T., B.S., R.N., M.S.

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Laboratory data on hemoglobin values for healthy females between the ages of thirteen and twenty-four years, accumulated in connection with a study made on hematopoiesis, challenge the making of this report. In 1941, 100 young ladies were studied<sup>1</sup>; in 1942, an additional 100 young ladies.<sup>2</sup> On the basis of this accumulated data and the discussion that follows it seems justifiable to assert that accepted hemoglobin normals as found in textbooks are too high.

The laboratory data as tabulated and graphed below were obtained as duplicate readings by means of carefully standardized Sahli and Haden-Hausser hemoglobinometers.

For accepted hemoglobin normals the best known textbooks were consulted in the order in which they have come off the press. Peters and Van Slyke<sup>3</sup> publish in their textbook a table compiled from the pooled hemoglobin normals determined separately by Haden, Osgood, Wintrobe and Miller, Appleton, Williamson, and Haden and Neff, each using either an oxygen combining capacity or spec-

\*Presented at the Annual Meeting of the American Society of Medical Technologists, June 11, 1944, Chicago, Ill.

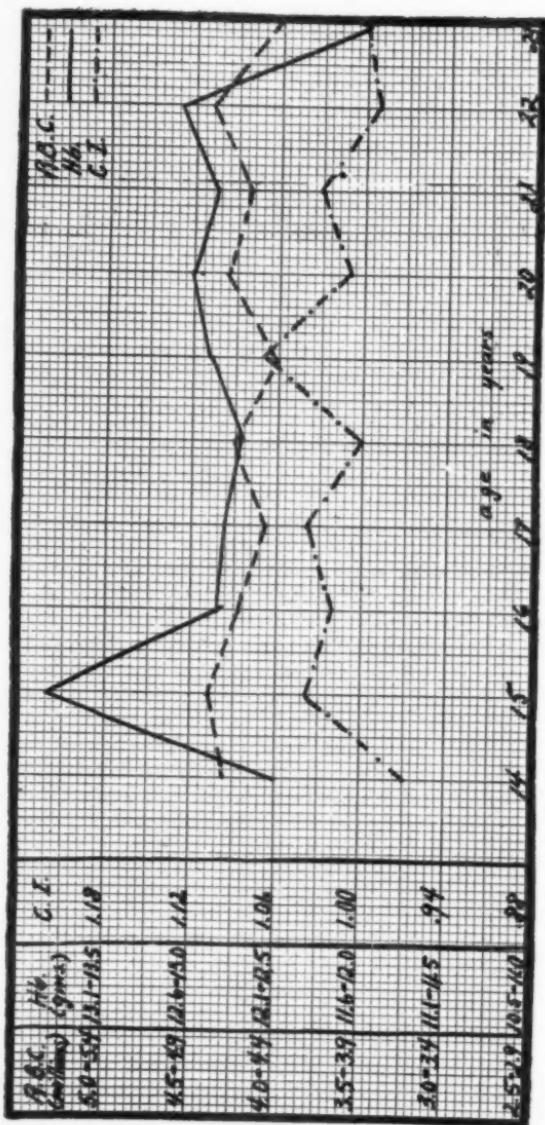


Figure 1—Hematological data on 100 young ladies taken in 1941.

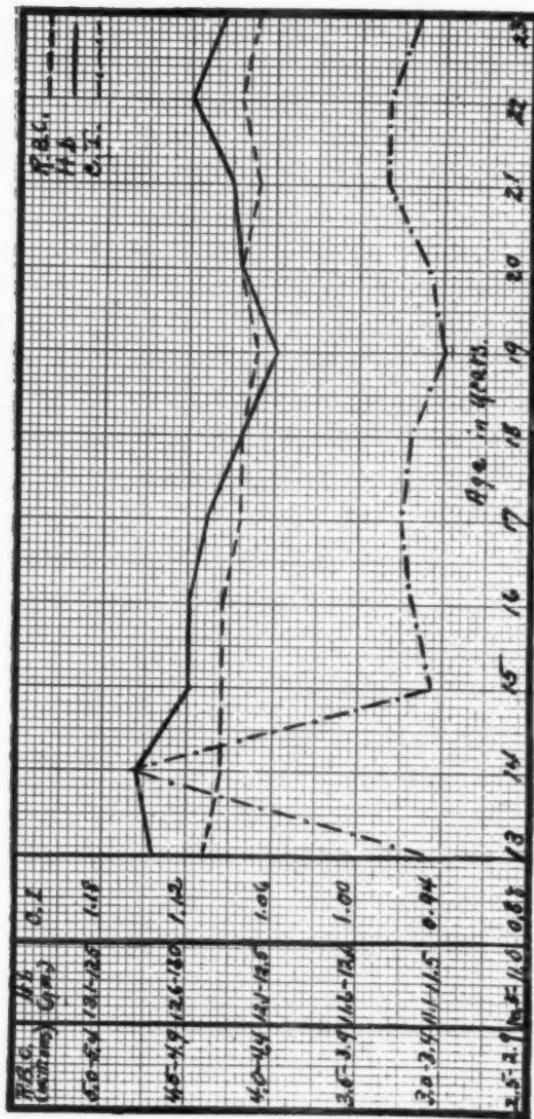


Figure 2—Hematological data on an additional 100 ladies in 1942.

trophotometric method. In this table the normal hemoglobin values for females between 16 and 20 years of age range from 14.9 to 15.3 gm. and for 20 to 25 years of age average 15.2 gm. per cent. Hawk and Bergeim<sup>4</sup> quote in their book the normals, apparently for adults, given by three outstanding scientists as follows:

- 13.8 gm. per cent by oxygen combining capacity method by Haldane,  
16.9 gm. per cent by spectrophotometric method by Williamson,  
15.6 gm. per cent by oxygen combining capacity by Haden.

recalculated on the basis of a normal erythrocyte count of 5,000,000 per cu. m. These textbook authors feel that the last is probably the most acceptable figure. Bodansky<sup>5</sup> feels that adult female values, attained at the age of about 16 years, are an average of about 14 gm. per cent. Cantarow and Trumper<sup>6</sup> commenting on Williamson's work in the spectrophotometric determination of hemoglobin say that his normal of 16.9 gm. per cent is "probably too high." Hüffner's estimation of 1.34 cc. of oxygen fully saturating 1 gm. hemoglobin they think "inaccurate." Yet they utilize that value and show that for females 16 to 60 years of age the normal hemoglobin value is approximately 14.4 gm. per cent  $\frac{(20.9-1.5)}{(1.34)}$ . Todd and Sanford,<sup>7</sup> in Figure 100 of their ninth edition, show Williamson's graph on normal hemoglobin values in which the latter makes sexual and age differentiations. For females 16 to 20 years the average hemoglobin is nearly 15.5 gm. per cent and for females 21 to 25 years it is 15 gm. per cent. But these same authors preface this illustration by their own conclusion that the general average for both sexes during adult life appears to be about 16 gm. per cent, and (presumably for mathematical ease in percentage conversion), an arbitrary standard of 16.6 gm. per cent may be taken as normal. They leave these ideas unrevised in their tenth edition.<sup>8</sup>

Todd and Sanford seemed to be prompted in determining their arbitrarily set standard by the work of Jenkins and Don<sup>9</sup> (experimenters in England), feeling that hemoglobin normals established for the English should likewise serve as normals for Americans. The once accepted textbook normal of 14.0 gm. per cent they reject as too low but in the light of the tabulation below and the discussion that follows 14 gm. does not seem to be low enough.

The following table compares pertinent facts from the English study with the facts of the present:

#### HEMATOLOGICAL DATA COMPARED

<i>Jenkins and Don</i>	Ages in Years	"Adults"	<i>Duluth Students</i>	
			1941 14-23 inc.	1942 13-23 inc.
Hb range in gm. ...		10.8-17.22	10.8-13.8	10.4-14.0
Mean Hb .....		14.0	12.64	12.41
Stand. Hb deviation		±1.16	±0.78	±0.74
Normal range .....		12.8-15.1	11.8-13.4	11.7-13.2

The mean hemoglobin on British females it is to be noted is 14.0 gm. while the mean on the two separate 100 Duluth subjects averages 12.52. The 200 Duluthians were residents of an educational institution. Had they the activity of non-resident students very likely the standard of deviation would be *positive* to 12.52 and hence make their hemoglobin normal about 13.1 gm. This is in accord with the findings of a number of other American workers.

The average hemoglobin is given by Moore *et al.*<sup>10</sup> as 13.1 gm. per cent (Moore's red cell count averaged 4.27 millions; Duluth's 4.25 millions per cu. cm.). Fowler and Barer<sup>11</sup> in their experimental studies in hematopoiesis came to the conclusion that accepted hemoglobin normals as given in textbooks are too high, for they say: "\*\*\*\* on the whole those values (referring to their hemoglobin values in their experimental studies), as well as those of other (normal) groups which we have studied are lower than accepted normal hemoglobin values." Representative readings for their healthy females between 15 and 23 years of age ranged from 10.8 to 13.2 gm. Carey\* in reviewing the findings on the first 100 subjects of this study, commented that in his office practice these readings were more in harmony with his findings than textbook normals. Donelson\* participating in a cooperative study\*\* made in seven midwest states of the Union on non-resident college students of approximately the same age span as the 200 Duluthians, reported a mean of 13.1 gm. on Minnesota girls.

Normal hemoglobin values have been made chiefly in research

\*Private communication.

by oxygen combining capacity or photospectrometric measurements. Normal hemoglobin values are made in routine more frequently by colorimetric methods than by any involving the other principles, and since the instruments for these colorimetric determinations are calibrated against standards prepared by oxygen combining capacity, the degree of accuracy or inaccuracy of the latter becomes inherent to the former.

There is no available data for humans for converting volumes of oxygen into grams of hemoglobin<sup>5</sup>; Hüffner<sup>6</sup> estimated that 1.34 cc. of oxygen combines with 1 gm. of hemoglobin when the latter is fully saturated but because of such variables as oxygen tension, carbon dioxide tension, temperature, and diurnal hemoglobin differences, either the saturation point, or the absolute quantity of hemoglobin cannot be perfectly determined. This being true, it follows with all due allowance for the many merits of the method, that when establishing normals, a check-test is indicated. Haden made it recalculation on the basis of red cell count. The results he thus obtained lend confirmation to the findings of this study: viz., that on the basis of 5,000,000 red blood cells per cu. cm. he calculates 15.6 gm. as normal hemoglobin; for healthy girls with 4,200,000 red cell count per cu. cm. the hemoglobin normal automatically becomes 13.1 gm.

#### *Conclusion*

It follows then, that if Jenkins and Don's mean of 14.0 gm. or the textbook stipulations of 16 or even 16.6 gm. as average hemoglobin values are to be universally used, the percentage of error ranges from 7 to 27 per cent which seems significant enough to warrant reconsideration of hemoglobin normals. Cognizance is generally taken of variation due to sex and age, but the question arises: Is enough attention given to geographical differences?

#### *Summary*

A study made on two separate groups of high school and college women totalling 200 subjects yielded as normal hemoglobin range 11.7—13.4 gm. with a mean approaching 13.1 gm. per cent. This, it was shown, is confirmed by other workers in America.

\*\*"Regional Project of the North Central States Relating to the Nutritional Status of College Women."

If 13.1 gm. is the true normal for females of late high school and college age, then textbook accepted normals are from 7 to 27 per cent too high. This seems significant enough to warrant reconsideration. The question arises: Is geography a factor having a greater influence on hemoglobin values than is thought generally?

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## LABORATORY IDENTIFICATION OF INTESTINAL PROTOZOAN PARASITES\*

By ELIZABETH PITSCHE, B.Sc., M.T. (A.S.C.P.)

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Lincoln, Nebraska*

It has not been too long ago that an order to our laboratory for stool examinations for protozoan parasites caused a feeling of inadequacy on the part of the technologists. This situation existed because there seemed no definite procedure for the collection and examination of stool specimens. The results were more or less those of the trial and error method and though repeated examinations were made they lacked the satisfaction of conclusiveness so desirable in scientific study.

That condition has been remedied to a great extent during the past five or six years. A definite method for the collection of stools has been outlined and followed for all such examinations on patients visiting our clinic. It has given very gratifying results. This routine procedure is as follows:

1. The patient is given two tablets containing bile salts and a mild laxative, such as phenolphthalein or cascara, three times a day between meals for two days preceding the test.
2. The patient is asked to report to the clinic on the morning of the examination without breakfast. There, a saline laxative (we use one ounce of phospho-soda solution in one-half glass of water), is given by mouth and the patient is directed to leisurely walk about for thirty minutes and then to eat breakfast and to choose those foods which are easily digested.
3. Directly after eating, the patient returns to the laboratory where the specimens of stool are collected.

As a rule, the first specimen of the day is discarded, because it is formed or semi-formed and has been in the distal part of the colon too long. About one-half ounce of the last portion of the

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\*Presented at the annual meeting of the American Society of Medical Technologists, June 11, 1944, Chicago, Ill.

second bowel movement is collected in a wax paper lined basin for examination. Almost without exception this is a homogeneous specimen of creamy or thin porridge consistency.

The premedication for two days served as an irritant which disturbs the parasites nestled deep in the mucosa and crypts of the gut, yet is not severe enough to disturb the patient too much. The strong cathartic given when the stomach and small intestines are empty produces a very rapid passage of the stool specimen through the colon with a minimum opportunity for morphological or physiological changes in the parasites.

The preparation of the slides for examination is very simple. The specimen is well stirred with a wooden applicator, a small drop is allowed to drain from the applicator onto the slide and a cover glass is adjusted. This is then examined as usual, first under low power to scan the field in making a general survey for the presence of parasites, then under high power for the identification of the organisms. Although it is very interesting to use the oil-immersion lens for the observation of these versatile and interesting cells, this is rarely necessary.

No particular precaution is taken to keep these specimens at a definite temperature, though one should avoid direct drafts of cold air or unusually lowered room temperatures. The collecting room is an inside room with a temperature range of from 65 to 80 degrees F. and the laboratory temperatures are in the same range. No warm stage is used. An effort is made to examine these stools not later than one to two hours after collection but, on a good many occasions, a positive specimen has been allowed to stand five or six hours, when upon re-examination the parasites have been found actively motile.

This method of examination is based almost entirely on finding and identifying the trophozoites. The identification in turn is based largely on the type of motility (7-8) and rate of motion, and external appearance, though the experienced worker learns also to identify many characteristic internal structures, such as the type of nucleus in the amoebae, inclusions in the cytoplasm, insertion points of flagellae, shape and direction of cystostomata in the flagellates, etc.

This method of examination offers a number of advantages. Because the identification is based on finding the trophozoite it is unnecessary to resort to stained preparations. Handling and examining large quantities of stool may be avoided (1, 4, 5). A representative sample of stool is obtained, thus eliminating the necessity for repeated examinations. Specimens may be held for a number of hours and examined at the convenience of the technologist without greatly lessening the degree of accuracy. A warm stage is unnecessary (10), thus eliminating extra equipment and manipulation. Various workers (1, 2, 3), have reported the need of searching for the cysts of the protozoan parasites, especially those of *Chilomastix mesnili* and *Giardia lamblia* as a means of determining their presence. By this method of examination we have been able to demonstrate the trophozoite in all instances. This seems to us to be much more satisfactory. Staining can be eliminated in all but the questionable cases. For a number of years during which about 500 specimens were examined, the findings were routinely checked by stained preparations. The results indicated a negligible percentage of error in the negative reports.

The method outlined above was used in a survey for intestinal protozoan parasites in the patients of the State Hospital for the Insane.\* This survey has not been completed, being interrupted by effects of the war, consequently the following report consists of the results of the examinations of only 250 patients. These were examined in groups of twenty at a time. A group was prepared and specimens collected as outlined above, once a week. Of these specimens, eighteen were unsatisfactory and are not considered in this report. The findings of the remaining 232 are as follows:

	No. of Spec.	% of Total
Total number of specimens showing parasites.....	86	37%
Number showing single infections .....	60	25.8%
Number showing double infections .....	20	8.6%
Number showing triple infections .....	5	2.2%
Number showing quadruple infections .....	1	0.4%

\*Under direction of Dr. H. W. Manter, Department of Zoology, University of Nebraska.

## Organisms found—

<i>Trichomonas hominis</i>	18	7.8%
<i>Chilomastix mesnili</i>	36	15.5%
<i>Entameba histolytica</i>	46	19.8%
<i>Giardia lamblia</i>	1	0.4%
<i>Entameba coli</i>	12	5.2%
<i>Endolimax nana</i>	1	0.4%
<i>Embadomonas intestinalis</i>	4	1.3%

## Single infection and incidence—

<i>Trichomonas hominis</i>	5
<i>Giardia lamblia</i>	1
<i>Entameba histolytica</i>	28
<i>Chilomastix mesnili</i>	16
<i>Embadomonas intestinalis</i>	1
<i>Entameba coli</i>	8
<i>Endolimax nana</i>	1

## Double infection groups and instances—

<i>Entameba coli</i> — <i>Chilomastix mesnili</i>	1
<i>Chilomastix mesnili</i> — <i>Trichomonas hominis</i>	3
<i>Trichomonas hominis</i> — <i>Entameba histolytica</i>	3
<i>Entameba histolytica</i> — <i>Chilomastix mesnili</i>	9
<i>Trichomonas hominis</i> — <i>Entameba coli</i>	2
<i>Entameba histolytica</i> — <i>Embadomonas intestinalis</i>	1
<i>Entameba histolytica</i> — <i>Entameba coli</i>	1

## Triple infection groups and instances—

<i>Chilomastix mesnili</i> — <i>Trichomonas hominis</i> — <i>Entameba hist.</i>	3
<i>Chilomastix mesnili</i> — <i>Trichomonas hominis</i> — <i>Embadomonas intest.</i>	1
<i>Chilomastix mesnili</i> — <i>Entameba hist.</i> — <i>Embadomonas intest.</i>	1

## Quadruple infection group and instance—

<i>Entameba hist.</i> — <i>Chil. mesnili</i> — <i>Trich. hominis</i> — <i>Embadomonas intest.</i>	1
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## Classification of groups found:

Class Rhizopoda  
 Order Amoebida  
 Species *E. histolytica*  
*E. Coli*  
*Endolimax nana*  
 Class Mastigophora  
 Order Flagellates  
 Species *Trichomonas hominis*  
*Chilomastix mesnili*  
*Giardia lamblia*  
*Embadomonas intestinalis*

The identification of the parasites, as has been stated, was based entirely upon the morphology of the trophozoites with the following characteristics as criteria: *Entameba histolytica*, the most commonly found parasite was, without exception, very active. It varied in size from 18 to 40 microns. The pseudopodia appeared suddenly and were clear, putting one in mind of a miniature soap bubble into which the fine granular substance of the ameba soon flowed. The organism moved onward by repetition of this method giving the appearance of having purposeful movement. Frequently the cells contained erythrocytes but very few bacteria. They remained active for from six to eight hours after collection at room temperature. The nucleus showing a dense periphery, was visible on a few occasions as it moved into a pseudopodium.

*Entameba coli* have been considered (6) the most common protozoa found in the stool of man. Our findings did not verify this. These trophozoites were found to vary from 15 to 35 microns in size. They were very sluggish, moving by means of granular pseudopodia, often extending a pseudopodium only to slowly withdraw it again. The cytoplasm reflected a greenish cast and contained many granules, some vacuoles and a few bacteria. The nucleus was large and conspicuous, appearing somewhat dense.

*Endolimax nana* is a small organism usually measuring less than 10 microns. It is actively motile and has clear pseudopodia. These are similar to those of *Entameba histolytica* in their clear consistency and rapid projection but, they differ in the withdrawal pattern which is a very definite clawlike arrangement lasting only an instant. The cytoplasm is fairly well differentiated into vacuolated endoplasm and clear ectoplasm. The nucleus is quite indistinct.

*Trichomonas hominis* are very active flagellates having a jerky motion and are readily confused with *Chilomastix mesnili*. They are heart-shaped, 7 to 18 microns by 4 to 8 microns in size. They move by means of several anterior flagella, an undulating membrane and a caudal process. Behind the base of the flagella and ventralad, a cytostome is plainly seen. An undulating membrane arises at the flagellar attachment and descends along the dorsal side to the caudal portion. It is definitely diagnostic. An oval nucleus is prominent, lying within a finely granular cytoplasm.

*Chilomastix mesnili.* These organisms are very active having a jerky spiral motion. They are pear-shaped and vary from 18 to 20 microns by 2 to 9 microns in size. There are three anterior and one posterior flagella. The character of motion and absence of an undulating membrane are diagnostic features. A conspicuous cytostome is present, beginning at the anterior end on the ventral surface and extending as a cleft toward the mid-plane of the body. As the organism is cooled, usually after a period of two or three hours, a sudden vigorous whirling motion may take place after which the trophozoite becomes encysted.

*Giardia lamblia.* These are top-shaped flagellates 10 to 20 by 6 to 10 microns in size. They are actively motile in fresh specimens of stool, but they soon cease to move upon standing at room temperature or even at body temperature outside the body. This organism has four pairs of flagella arising from the ventral surface. The dorsal side is rounded while the ventral side is cupped. Its lateral view has been described by Faust (6) as a half pear which has been cored. After motility has ceased one is apt to overlook these organisms but careful search will reveal them, often in fair sized groups. Two nuclei are usually present in a finely granular cytoplasm. Clear and easily differentiated cysts are always present when this organism is found.

*Enbadomonas intestinalis.* These small organisms are not commonly found. The trophozoite is ovate, having two anterior flagella and a slit-like anterior cystostome. The size varies from 4.5 by 6 microns to 3 by 5 microns. They move with a rapid whirling motion.

#### *Comment*

In view of the fact of which we are well aware that intestinal protozoan parasitic infections are world-wide in distribution and reach endemic proportions in temperate climates with an accepted incidence of from 5 to 10% (8) in the United States, it is highly important to recognize symptoms and pathologic changes produced by them. The most satisfactory method of diagnosis is to find the offending parasite. At best, the examination of stools is an unpleasant task. If not done well it is not only unpleasant but unprofitable. We believe that the method of patient preparation and

stool collection here outlined will reduce the number of specimens per patient and make the results of such examinations more accurate.

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## INTER-AMERICAN WAR ON DISEASE

By MAJOR GENERAL GEORGE C. DUNHAM

*Assistant Coordinator of Inter-American Affairs*

In this world struggle, nations have joined forces to fight total war on many fronts and in many forms of cooperative activity. But total war is more than the thunder of guns at the front lines or a clash of navies. In addition to the hum of factories turning out arms, it includes the bustle of farms producing food and the squirt of a sprayer killing mosquitoes in the Amazon jungles.

The war against disease and the struggle to increase wartime food production, as in the war against the Axis has required international cooperation on a larger scale than ever before. There is a notable difference. The war against disease never ends. Disease, man's oldest enemy, never has been fully conquered.

In the Americas, the war on disease has taken new shape in a great inter-American cooperative health and sanitation program. Nineteen of the American republics, including the United States, are participating in this cooperative work. The objectives of the programs are designed to support the fighting and productive strength of the United Nations. It benefits directly fighting men at army, navy and air bases and millions of workers producing minerals, fibers, rubber, food and other vital supplies throughout the hemisphere. More important, from the long-range view, this inter-American cooperation is helping to raise and unify hemisphere health and sanitation standards, which in turn is essential to the full development of the rich economic resources of the Americas.

The foundations of inter-American cooperation in disease control were laid before the war. One of the oldest agencies of international cooperation in health work is the Pan-American Sanitary Bureau, which for many years has not only done constructive work in improving hemisphere health standards, but has fostered good will and understanding among the Americas.

Additional machinery for inter-American cooperation in health work became necessary after Pearl Harbor. The groundwork was laid at the Rio de Janeiro meeting of American Foreign Ministers, held shortly after the attack on Pearl Harbor. The meeting recommended specifically that the American Republics undertake co-operative health and sanitation measures, in accordance with their capacities, to support the mobilization of defenses and strategic resources.

These proposals rapidly took shape and were translated into concrete action. The office of the Coordinator of Inter-American Affairs in Washington set up a health and sanitation division and organized a special corporate entity, the Institute of Inter-American Affairs to operate the program. As a result, today 18 of the 20 other American republics have entered into cooperative working agreements with the Institute ranging from two and a half to five years.

This march of inter-American cooperation in disease control over the past three years has resulted in the greatest mingling of medical skill and engineering knowledge in the history of the hemisphere. These experts have worked hand in hand with the American republics in their various projects to increase rapidly the hemisphere output of minerals, rubber, quinine, fibers and other strategic materials, together with food needed to meet the expanded requirements of all-out war production. This mobilization of hemisphere resources, together with inter-American cooperative program, has been a decisive factor for United Nations victory.

Disease problems of the hemisphere are as varied as the characteristics of the 21 American republics. Malaria, yaws, intestinal parasites, tuberculosis, and other ills peculiar to the tropics raised formidable barriers.

In three years 821 projects have been started, with 351 completed. The projects involve not only medical care, but building of health centers, dispensaries and hospitals, as well as sewers, water supply and other sanitation facilities. In addition, more than 300 doctors, engineers, and public health officials of the other Americas have received scholarships for advanced study in the United States through the Institute of Inter-American Affairs Training Program. Training of nurses has been initiated or ex-

tended in sixteen of the countries. Some \$35,000,000 allotted by the United States for the health work has been supplemented by allocations of nearly \$20,000,000 by the other American republics. In addition the other Americas have contributed land, equipment, buildings, services and labor which cannot be evaluated accurately in terms of dollars. Research and experimental work likewise have been broadened, with 78 laboratories in operation, or planned under the program.

Many of the projects undertaken primarily to support wartime defense and development needs are in areas destined for greater economic development, such as Brazil's Rio Doce Valley, one of the chief storehouses of minerals in the Western Hemisphere. Another example is the sprawling Amazon Valley, with its vast stores of rubber, vegetable oils, hardwoods and other tropical resources which find natural outlets in North America's temperate zone markets.

Malaria control work has played an important role in the program. An outstanding example of malaria control works is the extensive dike system recently completed at Belem, gateway of the Amazon. Water supply systems have been improved in Honduras, El Salvador, Nicaragua and other countries. Broadly, the entire program has emphasized the prevention of disease as its main objective.

Wherever the war against disease goes on, health education is a major instrument of strategy. Health education has been organized as an essential part of the entire program. Early in the program health education was organized in Paraguay through an initial series of radio health talks. By the end of 1943, seven of the inter-American cooperative health services had appointed directors of health education.

The benefits of the inter-American cooperative program will continue long beyond the war.

## DETERMINATION OF BLOOD CHOLESTEROL BY THE BLOOR AND LEIBOFF METHODS

### *A Comparative Study*

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A thorough study of the modified Bloor method of determining blood cholesterol had been made in previous research, in a study of the existence of a reciprocal relationship between basal metabolic rates and the cholesterol levels of human blood, in which the modified Bloor method alone was employed. The procedure, as it was followed at that time and in the present investigation as well, is presented below.

In a graduated centrifuge place:

9 cc. alcohol 95%.

3 cc. ether.

Mix and add 0.2 cc. fresh whole blood or serum.

Stopper and shake for 2 minutes.

Allow the tube to rest in a horizontal position for 30 minutes.

Decant the supernatant fluid into a small beaker.

Evaporate almost to dryness on a water bath.

Put in glass-stoppered graduated cylinder.

Make up to a 5 cc. volume with chloroform.

Make up a standard of 5 cc.=0.4 mgs. cholesterol.

To the unknown and the standard add 2 cc. acetic anhydride and 0.1 cc. concentrated  $H_2SO_4$ .

Mix by inverting twice.

Let stand in a dark place 15 minutes.

Read colorimetrically, with the standard set at 12 or 15 mm.

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Calculations:  $\frac{S}{U} \times 200 = \text{mgs. cholesterol / 100 cc. blood}$ .

In the present research, greater attention was given to the Leiboff method of determining blood cholesterol levels, the procedure for which is presented thus:

Place 0.25 cc. whole blood or serum on the filtering disc in a Leiboff tube.

Incubate at 37° for six hours.

Add 5 cc. chloroform to the tube.

Place tube in sand or water bath.

Attach reflux condenser and extract for one hour.

Remove condenser and filtering disc.

Cool in a beaker of cold water and make up to a 5 cc. volume.

Set up a standard with 5 cc.=0.4 mgs. cholesterol.

To the unknown and standard add 2 cc. acetic anhydride and 0.1 cc. concentrated  $H_2SO_4$ .

Mix and allow to stand in a dark place for 10 minutes.

Read colorimetrically, with the standard at 12 or 15 mm.

$$\frac{S}{U} \times 160 = \text{mgs. cholesterol /100 cc. blood.}$$

In each case, determinations were made by both methods on the same specimen under identical conditions of temperature, pressure, etc. In the first trial all of the determinations (by the Bloor method 125 and 130 mgs./100 cc. blood, respectively, and by the Leiboff 80) were much below the normal level (140-170 mgs./100 cc. blood) in spite of the fact that the blood was drawn after the ingestion of food, and should, therefore, have been above normal, if not normal. Viewed with the naked eye, the extent of color production of the standard in comparison with that of the unknown was such that it was believed that the standard was not a true standard. The reading on the colorimeter seemed to verify this suspected error. The solution had been made several months previously, and it is possible that the solution may have become concentrated through evaporation of the solvent. Therefore, a new standard was made and determinations were repeated on the same sample of blood as in the first trial.

Only the Bloor method was used in the second experiment, because it was believed that accuracy could best be obtained by a repetition of a method with which the experimenter was completely familiar rather than by one with which she was not well acquainted. The results of 160 and 170 mgs. of cholesterol per 100 cc. blood substantiated the existence of error in the first standard solution.

Although in the first trial it was also noted that the determination by the Leiboff method was considerably lower than those by

the Bloor method, this problem was not investigated immediately since the principal problem at hand was to determine the degree of error in the standard.

With an accuracy of solutions established, the experiment was again repeated with normal results being obtained by the Bloor method (159 and 166 mgs. %) and a lower figure (114 mgs. %) by the Leiboff method. This, however, could not be considered of significance in view of the fact that there was a loss of fluid in the attempt at mixing the solution after the addition of the acetic anhydride and concentrated  $H_2SO_4$ . The experiment was recorded as a third unsuccessful attempt and rejected.

In the fourth trial, normal figures of 160 and 166 mgs. % were obtained by the Bloor method, while the Leiboff again gave a decreased value of 133 mgs. %. The test was performed under ideal conditions, and as far as was known, there were no discrepancies in technique. Hence, the Leiboff method was again used in a repetition of the test, using a sample of blood from the same specimen, and the result was no higher.

In the performance of cholesterol determinations by the Bloor method, it had been learned that results obtained by the use of serum were identical with that of whole blood in regard to the percent of cholesterol present; and the absence of hemoglobin in serum eliminated the danger of poor color development induced by such interfering substances. Hence, in the fifth attempt to obtain a normal cholesterol employing the Leiboff method, serum was used instead of whole blood. Failure was met once more when a value of 130 mgs. % was obtained in comparison to the values of 160 and 176 mgs. % by the Bloor method.

The sixth experiment proved a complete failure when the Bloor method gave the low value of 130 mgs. % and the Leiboff 80 mgs. %. Here, even the value by the Bloor method failed to reach the normal level. Fresh blood was not obtained for this experiment and that used was a pooled specimen which had been standing for a period of seventy-two hours or more, so perhaps the failure to produce normal values may be explained by the fact that there was probable cholesterolysis occurring in the sample upon standing.

An attempt was made through all of these experiments to discover in the reports of previous investigative research any clew to

the probable cause of these repeated failures. The procedure as presented in any laboratory guide does not stress any particular precautionary measures, so it must be assumed that the ordinary care taken in the performance of any clinical laboratory test is sufficient to merit accurate results. One report by Leiboff stressed the fact that the incubation temperature must not exceed 37° C., as increased temperatures lower the results. This precaution was not observed in experiments 1 and 6, in which an ordinary oven replaced the incubator, not available at the time. The elevated temperature undoubtedly accounts for the unusually low results of 80 mgs. % received in these two instances. A more recent article by Leiboff reports that the test may be performed with accurate results without any incubation period, and that it is now being done in this manner to save time. The purpose of the incubation period is principally the drying of the blood on the disc, and this process is now eliminated in favor of a complete absorption of blood by the disc, a process requiring only a few minutes. It was also mentioned that the diameter of the lower end of the condenser should be as great as that of the upper end and should not taper as in the original Leiboff apparatus. The purpose seems to be to supply a greater area for the condensation of the vapor of chloroform over the disc.

The last important bit of information only recently encountered in reference reading concerns the composition of the absorbing disc itself. Leiboff claims that the disc must be of a special type, fat free, 1/16 inch in thickness, 3/4 inch in diameter, and must have a small perforation in the center. With these facts in mind, it is believed that the results in experiments 4 and 5, which were 133 and 130 mgs. %, respectively, are the best obtainable using a substitute filtering disc. These are, after all, not much below the lowest normal value of 140 mgs. %.

It is impossible to offer a definitely conclusive statement of the merits of one method of determining blood cholesterol over the other, considering the conditions under which the experiments were performed; but a probable conclusion may be reached. From the actual results obtained, it would seemingly be apparent that the method of Bloor with its modifications is far superior to that of Leiboff. However, it must be remembered that through previous

investigation, a very thorough knowledge of the Bloor procedure was obtained thus making it possible to conduct the tests with a much greater degree of accuracy than with the newer and unfamiliar Leiboff method. Most of the problems that may arise in the performance of the determination were already known in the Bloor method, likewise the means of solving these problems, whereas the knowledge of precautionary measures to be observed in order to obtain the most accurate results by the Leiboff method was reached only through this immediate research. From this stand-point, it would seem that the Bloor method already had an advantage over the Leiboff and would be an influencing factor in the decision of which is the more valuable method. The realization, however, that such an advantage does exist makes it possible to make due allowance for the same in the final judgment of the ultimate merits of each type of determination.

As has already been stated, it is believed that the subnormal values of 133 and 130 mgs. % received in experiments 4 and 5 by the Leiboff method were the best obtainable under the prevailing circumstances of a substitute filtering disc; and it may be assumed that, had a proper filter been used, values corresponding to those obtained by the Bloor method would have been reached. Hence, there is no scepticism regarding the actual possibility of accurate cholesterol determinations by the Leiboff method when conditions are favorable.

Bearing these facts in mind, it is, nevertheless, believed that the merits of the Bloor method, on the whole, exceed those of the Leiboff method. The Bloor method is less complicated. It involves the principle of protein precipitation (a principle common to many other laboratory determinations, and therefore, familiar to the technologist), a simple evaporation process followed by a quick (5 or 6 minutes) extraction, and finally the addition of the anhydride and acid to cause color production, the extent of which is measured to determine the quantity of cholesterol present. The Leiboff method involves a long incubation period of six hours and an extraction period of one hour, making a speedy performance of the test impossible. The principle upon which the test is based, namely, the ability of chloroform to remove the cholesterol from the blood on the disc, is complex because it presupposes that all

of the cholesterol can be thus removed and that there will be no interference by other substances in the blood, which by the Bloor method are precipitated before the extraction process begins.

The simple apparatus used by the Bloor method makes possible greater efficiency on the part of the technologist, even the most inexperienced. This is another advantage over the Leiboff method which requires comparatively complex apparatus and a complete knowledge of its operation to insure efficiency. Specialized equipment essential for the performance of a test always renders it less practical for general use, and unless such a procedure is found to be so advantageous that it far surpasses all other methods, it is usually not used extensively. For practical purposes it would be impossible to maintain a laboratory if each test required specialized apparatus and each piece of apparatus could be used for only one test.

In conclusion, then, may it be stated that although the Leiboff method of determining blood cholesterol is acceptable and produces accurate results, the modified Bloor method is preferred because it is believed to hold many advantages over the Leiboff procedure. Also, may it be said that although the Bloor method, which was already investigated in previous research, was determined to be the more desirable method, the information here obtained concerning the Leiboff method has enriched the scope of knowledge of the experimenter and shown that scientific investigation, undertaken even on a small scale, is always constructive.

## A SOURCE OF BLOOD FOR CULTURE MEDIA

By JOHN T. FITZGERALD

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It is the practice in many laboratories when requiring blood, for the enrichment of culture media or preparing blood agar plates, to obtain it from one of the animals which are usually kept on hand for pathogenic studies.

There are some laboratories which lack this source of blood and find it impractical, because of irregularly occurring requests for bacteriology, to maintain animals for this sole purpose.

To overcome this difficulty, the technician uses surplus blood which has been collected for the various lab tests or a donor is sought among the personnel. We recommend the use of defibrinated placental blood as a source superior to either of these. It is not always convenient to find a willing donor and unless the technician has previous knowledge of culture requests, he may not have sufficient blood available at the right time.

A nurse on the obstetric service procures the blood by collecting about 10 to 20 cc. into a sterile flask containing glass beads, after the cord has been ligated and before the placenta has been expressed.

The blood is defibrinated by gently agitating the flask for about five minutes, after which it is then sent to the lab, where it is transferred to a small cotton plugged sterile bottle.

We have found the blood, so treated, to keep for three weeks and sometimes longer, before showing signs of hemolysis.

To make a blood agar plate, 1 cc. of this blood is added to 10 cc. of melted agar and mixed by rotating between the hands. It is then poured into a petri dish and when cooled the plate is ready for seeding.

### *Summary*

A suitable source of blood for culture media enrichment is presented and the method of procuring it is described.

## **ABSTRACTS**

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**NEW GUINEA MOUTH:** Bull. U. S. Army Med. Dept., Vol. IV, No. 1, July '45, p. 30.

These cases were characterized by sloughing of the interdental papillae, exposing the bone between the teeth, as well as by pain. Smears showed Vincent's infection with spirochetes having 3 or 4 loops, and few fusiform bacilli. Routine treatment for Vincent's stomatitis was effective.

**MODIFICATION OF ACID-ETHER METHOD OF FECAL EXAMINATION FOR INTESTINAL SCHISTOSOMIASIS:** Bull. U. S. Army Med. Dept., Vol. IV, No. 1, July '45, p. 41.

To prevent the entrapment of eggs within the layer of floating debris in this method, various detergents were added to the HCl-feces mixture in the amount of 0.6 cc. of a 10% aqueous solution. The average percentage increase for the recovery of schistosome eggs for the various detergents was as follows: Triton NE—82%, Tergitol 08—50%, Nacconal NR—39%, Duponal C—23%.

When Triton NE was used, the number of positives of *S. mansoni*, hookworm, *T. Trichiura* and *A. lumbricoides* was increased but the number of positives of *S. stercoralis* was decreased.

**TREATMENT OF DIPHTHERIA CARRIERS WITH PENICILLIN:** B. Berman & S. Spitz, Bull. U. S. Army Med. Dept., Vol. IV, No. 1, July '45, p. 87.

Of 22 cases of proved diphtheria carriers, 10 were given local applications to the nose and throat of penicillin 500 U per cc. for 5 days, at which time they were negative. Of the 12 untreated controls, 7 became negative in 5 weeks. The other 5 remained positive for 2 weeks more after which they were given penicillin and became negative in 6 days.

While penicillin is effective against the diphtheria organism, the authors caution against its use instead of anti-toxin and cite a fatal case in which it appears to have been ineffective.

**PLASMA OR SERUM AS A DILUTING FLUID FOR THIN SMEARS OF BONE MARROW: K. M. Endicott, Stain Tech., Vol. 20, No. 1, Jan. '45. Pp. 25.**

A method was sought whereby the thick masses of cells on bone marrow slides could be avoided. Physiological saline, Ringer's solution and Tyrode's solution caused distortion of cells. Plasma or serum provides a protein matrix in addition to its isotonicity and thus prevents distortion.

Bone marrow was mixed with serum or plasma by means of aspiration and expulsion on a glass slide using a capillary pipette. The mixture was then drawn up into the pipette and a small drop placed on each of several clean slides. These were spread as for blood smears and allowed to dry. Wright, Giemsa and peroxidase stains have been used satisfactorily. The following method is suggested: "Fix 3-5 minutes in absolute methanol. Allow to dry. Stain 30 minutes in a Coplin jar containing 1:50 aqueous dilution of Giemsa stain (800 mg. per 100 ml. glycerol-methanol) buffered to pH 6.0. Drain and allow to dry." Using the stain at pH 6.0 brings out the hemoglobin and decreases nuclear staining.

**A FLUID MEDIUM FOR THE ENCYSTATION OF ENDAMOEBA HISTOLYTICA UNDER REDUCED ATMOSPHERIC PRESSURE: L. K. Zuckerman and H. E. Meleney, Jr., of Parasitology, Vol. 31, No. 3, June '45. Pp. 155.**

The cultures used are kept on Cleveland and Collier's Difco Endamoeba medium plus 2% agar and overlayed with inactivated horse serum-Ringer's solution in the proportion of 1-10.

The medium used is CPR medium consisting of cholesterol, 1 ppm. and Difco proteose peptone 0.5% in Ringer's solution. 2% Ceraphyl is suspended in this medium and it is autoclaved at 15 lbs. for 20 minutes. It is filtered and resterilized. A few hours before use it is distributed in 50 cc. portions in 250 cc. Erlenmeyers and again autoclaved. Just before use 5 cc. of inactivated horse serum and 0.02 g. especially prepared rice starch are added. Flasks are then inoculated, evacuated to 44 mm. mercury pressure and incubated at 37° C. for approximately 70 hours.

**SOME BIOLOGIC CONSIDERATIONS OF GALLSTONES:** H. Gouss, Am. Jr. Diges. Dis., Vol. 12, No. 6, June '45. Pp. 187.

The formation of gallstones is a complicated biochemical mechanism involving infection, changes in the composition of bile and biliary stasis.

Bacteria may gain entrance via the blood stream or by ascending from the intestine. They should be destroyed but are not always. They may become established in the wall of the gallbladder. Even when rendered inactive, they may form the centre about which deposition occurs.

The ratio of cholesterol to bile salts is usually about 1 part to 20 or 30 parts of bile salts. This ratio may be disturbed by conditions resulting in high blood cholesterol or by various factors which result in loss of bile salts. This brings about precipitation of cholesterol. The precipitation of cholesterol is also favored by altered flow or change in composition of bile due to biliary stasis. Since the mechanism of formation of gallstones is not dependent upon the gallbladder itself, cholecystectomy does not terminate it.

**SULFANILAMIDE—EXPERIMENTAL PRODUCTION OF LIVER DAMAGE: ITS EFFECT ON GASTRIC ACIDITY:** M. Streicher, Am. Jr. Diges. Dis., Vol. 12, No. 8, Aug. '45. Pp. 267.

Sulfanilamide was administered to dogs in 60-grain doses three times weekly with food over periods up to 40 months. Liver biopsies were studied. There were no gross changes in the liver. Microscopically the fat remained unchanged, cellular elements showed atrophic changes and after prolonged intake, the glycogen was decreased. The progressive liver damage depressed the gastric acidity. It is suggested that all these changes point toward the theory of ideo-syncreasy.

**BUFFER PRECIPITIN TEST FOR MALARIA:** E. Bogen, U. S. Navy Med. Bull., Vol. 45, No. 1, July '45, p. 47.

The technique of the Wo'ff Buffer Precipitin Test is described in detail. The test is based on the observation that normal human serum, added to distilled water at pH 7.7 remains clear but serum

from malaria patients shows a diffuse cloudiness either at once or within 1 to 2 hrs. The reaction is thought to be due to a euglobulin which may be either a product of the living or dead parasites, the tissues damaged by them or possibly an antibody produced in response to them. The reaction is strongest in active malaria between paroxysms and in recent recoveries but remains positive for a long time. It is particularly applicable at periods when the thick blood smears are negative.

**STAINING OF MUCUS WITH BUFFERED SOLUTIONS OF TOLUIDINE BLUE T, THIONIN AND NEW METHYLENE BLUE N:** B. Highman, *Stain Tech.*, Vol. 20, No. 3, July '45. Pp. 85.

Stains were used in 1:500 aqueous solution. Buffer solutions were M/10 citric acid in M/5 anhydrous disodium phosphate in 25% methanol. These were added to the stain solution in various proportions. Staining time was varied from 30 seconds to 1 hour. Sections were washed in water and treated with acetone, acetone and xylene mixture, xylene and clarite. Connective tissue mucus stained best when the pH of the buffer varied from 3.4-3.95 while epithelial mucus was satisfactory when the pH was 2.2-3.95. The concentration of the stain and the percentage volume of the buffer solution may vary widely without detriment to the tissue.

**EXPERIMENTAL TRANSMISSION OF RHEUMATIC FEVER:** W. S. C. Copeland, *Ann. Rheum. Dis.*, Vol. 4, No. 2, Dec. '44. Pp. 37.

The blood of a patient with typical rheumatic fever was injected into five volunteers. Blood was taken from the subjects showing positive reactions and injected into another group of volunteers. This was repeated. It was found that only in the fourth "generation" were no further reactions obtained. Apparently rheumatic fever can be transmitted in the blood of anyone actively suffering from it. The syndrome of rheumatic fever appeared to be made up of two entities, a febrile non-specific element and a specific fibro-toxic element. There was some indication that these developed independently in some of the volunteers.

**CHRONIC EXUDATIVE AND INDURATIVE PNEUMONIA DUE TO INHALATION OF SHELLAC:** E. F. Hirsch and H. B. Russell, Arch. Path., Vol. 39, No. 5, May '45. Pp. 281.

This is a case report of a chronic lung condition which was thought to be a fungous infection or a lung tumor. On autopsy both lungs showed chronic diffuse exudative and indurative pneumonia with evidence indicating it might be of a lipoid nature. On extraction with ethyl alcohol and ether large amounts of a viscous material resembling shellac in an oil medium were obtained. It was possible to reproduce a similar condition in animals by the use of this.

**VINCENT'S DISEASE OF THE SKIN:** A. Strickler, Arch. Dermat. and Syph., Vol. 52, No. 2, Aug. '45. Pp. 87.

This is a description of a case of Vincent's disease with lesions on the feet, the corners of the mouth, the gums, the tongue and the tonsillar and pharyngeal regions. The symptoms given were: difficult walking, stinging sensation when the feet were touched by anything, fetid odor, purulent discharge and loosening of nail from nail bed, and the formation of a lesion in an interspace.

**A METHOD TO ELIMINATE OPACITY ON MOUNTING HOOK-WORMS:** T. N. Tahmisan, Stain Tech., Vol. 20, No. 1, Jan. '45. Pp. 26.

The opacity which was found in approximately 90% of hook-worm mounts was not due to improper dehydration or to exposure to air as previously believed. Worms which remained clear were always ruptured. Opaque worms were pierced with fine needles. Pressure then gave rise to bubbles of gas. After this the worm cleared. In order to prevent opacity, the hookworms were dehydrated to 70% alcohol and then their cuticles were pierced with fine needles under a dissecting microscope. After this the dehydration, clearing and mounting were carried out as usual. The suggested explanation given is that balsam causes a very rapid exosmosis of the clearing oil resulting in the formation of a gas under the cuticle. This then becomes opaque due to the diffraction of light.

**CHEMOTHERAPEUTIC STUDIES IN RICKETTSIAL AND VIRUS DISEASE: H. Pinkerton, Sou. Med. Jr., Vol. 38, No. 6, June '45. Pp. 371.**

Diseases of viral or rickettsial nature have generally proven resistant or have been adversely affected by the chemotherapeutic agents so effective against bacteria. This is thought to be due to the fact that they live within the body cells. They may thus be mechanically protected as well as being protected chemically. Various experiments led to the fact that the addition of p-aminobenzoic acid to the diet of typhus-infected mice, prevented illness. Penicillin can also be used for the bacterial complications of typhus. Because p-aminobenzoic acid does not kill rickettsiae exposed directly to it, it is thought that its *in vivo* effectiveness is due to the changes it causes in cell metabolism. Riboflavin deficiency lowers resistance to typhus but increases resistance to polio in mice while thiamin deficiency increases resistance to polio but lowers resistance to psittacosis.

Substances which stimulate intracellular metabolism may be expected to have a favorable effect on diseases caused by rickettsiae and some of the larger viruses while they may have an adverse effect on diseases caused by the smaller viruses. It is suggested that this principle might also find application in the control of malignant disease whether or not it is due to viruses.

**METHOD FOR ISOLATION OF MOTILE BACTERIA: Bull. U. S. Army Med. Dept., Vol. 4, No. 1, July '45. Pp. 38.**

An apparatus devised by Lt. Col. Max Levine and Maj. Paul Preisler for the separation of motile and nonmotile bacteria is illustrated and described in detail. It consists of a small tube open at both ends but with a shoulder 2-3 mm. wide 10 mm. from one end and a 3 mm. perforation in its wall 20 mm. from the other end. This tube is inserted into a larger tube and the larger tube is then filled with a semi-solid medium to a point a little below the shoulder of the inner tube. This is sterilized. Tubes are inoculated by stabbing into the agar of the inner tube to a point not closer than 12-15 mm. above the hole in its side.

Growth of the non-motile organisms remains within the inner tube along the line of inoculation while the motile organisms are able to migrate through the perforation into the outer tube.

**DETERMINATION OF BLOOD LEVEL OF VITAMIN C IN CHRONIC RHEUMATIC DISEASE: E. A. M. Bradford, Ann. Rheum. Dis., Vol. 4, No. 2, Dec. '44. Pp. 43.**

The method used was that of Deeny, Murdock and Rogan with slight modifications. 183 cases of chronic rheumatic disease of different types were studied. It was found possible to raise blood vitamin C as high by means of a purely vegetarian diet as by the administration of 200 mgs. of synthetic vitamin C daily. It was also found that saturation with vitamin C brought about an improvement in general health.

## EDITORIAL

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Organizations exist for a purpose. The body of an organization is its membership. Members are those who, having the requisite qualifications, voluntarily submit to the requirements for admission.

For doctors there exists the powerful American Medical Association, for the nurses the powerful American Nurses' Association; for hospitals the powerful American Hospital Association and the powerful Catholic Hospital Association. For medical technologists there exists the American Medical Technologists' Association known as the American Society of Medical Technologists. Is it powerful? No! Why not? *We* have not made it so!

Where does the AMA get its power? From its membership. No doctor can afford to remain outside of the Association without jeopardizing his own professional advantages and social prestige. Where does the ANA get its power? It, too, grew from humble numbers to the vast enrollment of nearly 170,000 members. Every nurse who bears the insignia RN belongs to it. *Every* nurse in America who has graduated from an approved school of nursing is joined up with the ANA. Likewise it may be demonstrated that the strength of the AHA and CHA rests in the totality of their respective memberships.

Now what does the AMA, or the ANA, or the AHA, or the CHA say to its members? It says: "Doctor (Nurse, Institution)! I exist for you and BECAUSE OF YOU. My life, my spirit, and my strength are the life, spirit, and strength you give me. I was created because I believed that *in unity lies strength*; I was endowed with high ideals of service. From me goes out the dividends you make it possible for me to give you: National recognition; improvement in professional status; opportunities for growth; standards of service, distribution of service; and the inner satisfaction and pride of knowing you are extending the services of a PROFESSION with dignity and with consideration to all that need them."

Strange to say the ASMT cannot argue in the same manner for medical technologists. Why not? It is not enjoying the full life, spirit, and strength it would have with your membership, and consequently is unable to yield a full quota of dividends.

The Registry for Medical Technologists now holds a roster of 11,162 names. Of these only 1,081 belong to the ASMT, the other 10,079 and those who have never come through the Registry, are earning their bread and butter by medical technology but they are not sustaining it nor do they realize the need of organization. Many of them have been disappointed by their inability to attain commissions as medical technologists in the armed forces. Others have been baffled when they attempted civil service examinations, being forced to call themselves "bacteriologists" in order to be entered at all. After passing the examination and receiving government employment they were generally put at something other than bacteriology. Others, contemplating a trip to, we'll say Scotland, could not obtain a passport as a medical technologist. They had to devise some other professional name for their academic preparations in order to pass as professional people. MEDICAL TECHNOLOGY IS A PROFESSION and we medical technologists are PROFESSIONALS although the world at large has not given us this recognition. There is a large group even among medical technologists that does not recognize that fact. Our profession is as dignified as medicine, nursing, or record librarianship, and it is the closest kin to medicine.

Unlike the AMA, ANA, and a few other organizations having their own standardizing bodies, medical technologists pass through The Registry for Medical Technologists of the American Society of Clinical Pathologists before they are pronounced qualified. This Registry, the first of all bodies to organize in the interests of medical technology, began in 1928 with the purpose of promulgating standards for, and recognizing qualifications of, laboratory workers, and establishing standards for training schools for medical technologists. With the passage of time, accidentals changed in the management of the department, but fundamentally the purposes remained the same. It attained the goal it set, and now is given endorsements on its policies by the AMA, the American College of Surgeons, the AHA, and CHA. Instead of operating under statu-

tory control, it functions by professional approval of the already mentioned organizations, and by the volition of the medical technologists subscribing to its traditions. Because of the excellence of its rating with hospital groups, it gives status to medical technologists, and a sound basis for membership in organizations for medical technologists.

But not all medical technologists are subscribing to it. There are a number of graduates from degreed courses in medical technology who can, but who are not encouraged to "register"; and a lesser number, who because of commercial school affiliations, cannot "register." The former maintain that the standards of their own alma maters are wider in scope than the Registry standards. Ought not the fact that their alma maters have such a highly developed course in medical technology promote a feeling of security in these graduates? Do we not see parallel instances in which provision is made for more than the need requires? Do we not take along more money on a trip than the minimum required to meet expenses? Are we not served at every meal on our table more than the minimum? Are we not given more in lecture notes than the professor will question us on in the final examination? When contemplating travel by train do we not leave "home" earlier than is necessary to get to the station? When we suffer tissue injury does not nature produce more cells than necessary to repair it? Now what does the excess money, excess food, excess knowledge, excess time afford the possessor? It gives a feeling of security, confidence, leisure and conviction. So should college requirements demanding excess preparation instil the graduates with conviction, confidence, and security, realizing that with their superior qualifications they can pass the Registry without difficulty, maintain a position, and discharge their duties in an atmosphere of leisure, and dignity. This group can make medical technology pay dividends.

The situation is different for the commercial school graduates. Most of them were attracted to a commercial school through high-power advertising. The speed with which they obtained their training smoke-screened other facts. Consequently they have often spent as much money in nine months as the student of an accepted school spends in several years. They miss their internship in an approved hospital and must learn by hard experience after they

are "graduated." They usually start out as an assistant, which, without their knowledge, proves to be their internship. They seldom get employment in a large institution which affords a choice of work; rather they hire out to the first employer, are retained because by nature they work hard, do their master's bidding, get the experience, and perhaps in time, the promotion. That same individual would have saved time, money, and acquired professional prestige, had he gone the right way from the beginning. The truth is that by the time he is really earning, and doing all of medical technology, he has covered the equivalent of the minimum required by the Registry, but he has had to piece it out, ending in never being certified. The like of these can never make medical technology pay dividends.

The national deficit in dividends might not be so great were the support given it by the state organizations stronger. While Minnesota has a state society, incorporated virile, and functioning since 1936, when it was organized to further the interests of the American Society of Medical Technologists, it is not paying the dividends it should for there are only 165 members in its organization which does not include, therefore, *every* medical technologist in the state. Its members are graduated from the eight approved schools for medical technologists located in the three largest cities of the state, viz., Minneapolis, St. Paul, and Duluth, and graduates that have moved into the state from other centers. Like the national organization the Minnesota Society admits only those bearing certificates from the Registry. Some Minnesotans have made this the hurdle that prevents them from joining rather than support their state organization with pride. The Minnesota Society is so soundly organized that if ever medical technology succeeds in unifying the local, state, and national organizations into a structure similar to that of the nursing organizations, the Minnesota state society with the national organization, could readily fit into the pattern without impediments.

May one quote the following to help illustrate further what organization has done for Minnesota medical technologists? A pathologist with experience in Massachusetts, California, and Texas clinical laboratories attended a meeting of one of the local societies in Minnesota. After the business meeting and an address delivered

by a guest medical technologist he made the following remark: "Now I know why Minnesota medical technologists are to be preferred. When I sought employees from the Medical Bureau I always said to M. Burneice Larson, after my first experience with girls from Minnesota: 'Send me registered medical technologists from Minnesota'."

These little dividends, which organization in Minnesota is making for Minnesota medical technologists, are stimuli that are experienced in other state organizations; but until medical technology aspires to greater unity there will not be greater strength. The gap in the national membership between 11,162 possible and 1,081 actual members, is appalling but in the next breath one must say it is likely not intentional—it probably is due to lack of knowledge. A good educational campaign is the solution and we all should take part in it. The enlightened medical technologist must educate prospective medical technologist students about the undesirability of the commercial school; must speak to the newly registered graduates about the state and national organizations existing to pay them dividends and the need of their membership; and lastly the degreed medical technologist, rising above his dislikes and looking toward unity, must qualify himself for membership. Then will all the dividends we at this time visualize come to us, and in the future our profession will continue to meet need.

—*Sr. M. Alcuin, O.S.B., Duluth, Minn.*

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3. Medical Technology—A Profession for Women—Adv. released by Rg., Muncie, Ind.
4. ANA and You—A publication from headquarters of ANA, 1790 Broadway, New York 19.

## NEWS AND ANNOUNCEMENTS

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Vernon S. Lilly, M.D., F.A.S.C., who for many years has been a member of the Editorial Board of the American Journal of Medical Technology, passed away October 3, 1945. Dr. Lilly was a loyal worker in the interests of the Journal and responsible for many of the book reviews appearing during the past several years. His able assistance will be greatly missed.

—*Editor*

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### AN ABSTRACTING SERVICE FOR HUMAN BIOLOGY

The trustees of *Biological Abstracts* announce the establishment, beginning in January, 1946, of a new section of *Biological Abstracts*—Section H, specially assembled Abstracts of Human Biology—intended for anthropologists, sociologists, psychologists, neurologists and psychiatrists, students of child development and human welfare, and students of man generally.

The new section will be an assemblage of all abstracts published in *Biological Abstracts* dealing with the broad field of human and social biology. Biological studies on human inheritance, on population and fertility, on endocrine and neurological factors affecting growth, development and human personality, on alcoholism and drug addiction, and on nervous disorders and mental deficiencies, and broad nutritional and epidemiological studies affecting human welfare, are some of the many fields that will be covered. The annual subscription price for the ten abstract issues, plus the complete index of the year's volume of *Biological Abstracts* will be \$6.00 (\$6.50 outside the United States).

Full information may be obtained by writing to Mr. H. I. Anderson, Business Manager, *Biological Abstracts*, University of Pennsylvania, Philadelphia 4, Pennsylvania.

The following letter from a former member of the editorial board was received late in September.

HOLY FAMILY HOSPITAL

Rawalpindi, India

July 10, 1945

Dear Mr. Conlin:

As the Journal of the American Society of Medical Technologists has been coming so regularly, in spite of flood, famine and war, I feel that I should at least once in five years let you know that I am still getting it, that I am still alive, and that I appreciate your sending the Journal gratis to an impecunious missionary.

You may wonder what I am doing these days. Well, this hospital averaged 80 in-patients daily last year and 110 out-patients daily. Lack of space and personnel has impeded our progress. We have plans made for a 350-bed hospital which we are waiting to build when the war is over. The European war is over but the Japanese war is the war they mean around here when they say "when the war is over." Europe is a vague place far away from here, but Burma is just around the corner and the Japanese are the enemies. But perhaps that will all be over too by the time you receive this.

I have the pharmacy here and the out-patient department. This year we seem to be averaging 150 patients daily in the out-patient department. I also do some laboratory work, but not what should be done and what will be done when we get into our new building with a proper laboratory and more help. For instance, the malaria season has begun—though far from its peak yet. Well, out of 150 patients in the dispensary in one morning perhaps 40 have come because they have "fever." I used to take slides once in a while and saw some "beautiful" malaria of all types, but that sort of thing is time-consuming. Now I find that if I ask the patient, "Is it malaria," nine times out of ten the patient gives the correct diagnosis herself. They know malaria. It's just a matter of handing out the quinine or atebrine. But if they don't know, or if the symptoms do not agree—well, the doctor diagnoses some as TB

(extremely common), but our TB patients get spells of malaria, too. Occasionally it is Kala-azar, etc. It is in the obscure cases that we bother about the laboratory findings.

As for other things—we get occasional leper patients (we send them to the Leper hospital 20 minutes away), we get many oriental sores, other sores and ulcers, "everybody" has trachoma, and then the usual run of gyn. work we get back home. Oh, and "everybody" has amoebic or bacillary dysentery at one time or other.

Fortunately we have been able to get all the atebrin we want (now), and all the sulfa drugs, etc. What the people need most is public health education. Latrines are unknown (as in most of India), TB patients spit on the floors of their homes (often dirt floors), while at the same time the babies are playing around on the same floor. That sort of thing. I could go on endlessly. But the mosquitoes and flies! If only we could get some of that marvelous DDT I have been reading about. If only some Americans who know how to use it would come around with tons of it and use it or teach others how to use it to eliminate the mosquitoes, flies, etc. By the way, typhus and plague are endemic here and nobody makes much fuss about it. It is a very interesting place in which to work. But I mustn't write a book, especially in such haste and such careless style. But I don't want to take time to rewrite.

Kindest regards to those who remember me back home.

Sincerely yours,

Sister Alma (Le Due)

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*Minnesota*

Miss Frieda Claussen has been appointed counsellor for the block of states known as the "north central." These include Wisconsin, Iowa, North Dakota and South Dakota as centered about the nucleus, Minnesota. Miss Claussen has appointed as far as possible assistants in these states to aid in promoting the interests of the national society. To date her appointments are:

Subcounsellors: Sr. M. Edeltrude, OSJ, St. John's Hospital, Fargo, North Dakota; Harry J. Falconer, City Health Lab., Sioux Falls, South Dakota; Ruth Aufderheide, Iowa Methodist Hospital Lab., Des Moines, Iowa. The Wisconsin subcounsellor appointment is pending.

At a recent board meeting of the Minnesota Society of Medical Technologists the following board members responded to roll call: Frieda Claussen, Eileen Smith, Margaret Strane, Zona Brandt, Fern Wagner, Eleanor Eggleston, Catherine Hanitsch, and Esther Wilbrecht.

The following committee appointments for the same state society are the following:

**Membership:**

Frieda Claussen, St. Paul, Minn.

Eileen Smith, Minneapolis, Minn.

**Education (Program):**

Janet Crone Prevey, Mankato, Minn.

Eleanor Eggleston, Minneapolis, Minn.

**Nominating:**

Mary Conroy, 865 Iglehart Ave., St. Paul, Minn.

**Charter and By-laws:**

Eileen Smith, Minneapolis, Minn.

**Standards and Studies:**

Irma Swanson, St. Luke's Hospital, Duluth, Minn.

**Professional Promotions:**

Sr. M. Alcuin, OSB, College of St. Scholastica, Duluth, Minn.

Chauncey Winbigler, St. Joseph's Hospital, St. Paul, Minn.

**Minnesota Officers—1945-1946**

**President.....** Esther I. Wilbrecht  
301 N. Jefferson St., New Ulm, Minn.

- President-elect ..... Eileen Smith  
1329 Logan Ave. N., Minneapolis, Minn.
- Secretary ..... Margaret Strane, Miller Hospital, St. Paul, Minn.
- Treasurer ..... Zona Brandt, Mounds Park Hosp., St. Paul
- Vice-President ..... Fern Wagner  
Minneapolis General Hospital, Minneapolis, Minn.
- Librarian ..... Dorothy Magaw, 315 Dayton Ave., St. Paul, Minn.
- Board of Directors : Sr. M. Alcuin (1946), Duluth ; Miss Catherine Hanitsch (1945), Oak Terrace ; Eleanor Eggleston (1947), Minneapolis.
- Past-President.....Chauncey Winbigler, St. Joseph's Hosp., St. Paul

### **ARKANSAS**

Society Name	Chartered	Meetings	Secretary's Address
Arkansas Society of M.T.	National	Quarterly	Ann Snow, M.T. 216 East D. Ave., Park Hill N. Little Rock, Ark.
Little Rock Society of M. T.	State	Quarterly	Mrs. Chas. Wilkens, M. T. Baptist State Hospital N. Little Rock, Ark.

### **CALIFORNIA**

Santa Barbara Chapt. of M. T.	None	Monthly	Mary C. Ryan, M. T. Santa Barbara Gen. Hosp. Santa Barbara, California
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### **COLORADO**

Colorado Society of M.T.	National	Monthly	Annalee Breslford, M.T. 1560 High Street Denver, Colorado
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### **DISTRICT OF COLUMBIA**

District of Columbia Society of M.T. Pres.—Zanerian E. Funk	National	Monthly	Evelyn F. Ballou, M.T. 4105 Third Street N.W. Washington, D. C.
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### **GEORGIA**

Savannah Society of M.T. Pres.—Sadie Cartwright	National	Monthly	Jurelle S. Hooper, M.T. 20 East 56th Street Savannah, Georgia
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### **ILLINOIS**

Illinois Society of Clinical Laboratory Technicians Pres.—Fannie Warnock Chicago Society of M.T. Pres.—Helen E. Sunderland	National	Semi-annual	Edna H. Murmann, M.T. 3924 N. Monticello Ave. Chicago, Illinois
	National	Monthly	Joyce James, M.T. 939 North LaSalle Street Chicago 10, Illinois

### **INDIANA**

Indiana State Society of M.T. Pres.—Virginia Sue Alley	National	Annual	Hazel Childs, M.T. Indianapolis City Hospital Indianapolis, Indiana
Indianapolis Society of M. T. Pres.—Mrs. Earl Lynn	National	Monthly	Miss Helen Kottolowski 1230 Villa Ave. Indianapolis, Indiana

### **KENTUCKY**

Kentucky Society of M.T.	National	Monthly	Dorothea Distler, M.T. 860 Eastern Parkway Louisville, Kentucky
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**LOUISIANA**

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St. Landry Parish Society of M. T. State Monthly  
Pres. Harriett Cyperf

**MASSACHUSETTS**

Worcester District of M. T. National Monthly  
Pres.—Marjorie Inman applied for  
Jane C. Zalesda, M. T.  
16 Montrose St.  
Worcester, Mass.

**MINNESOTA**

Minnesota Society of M. T. National Annual  
Pres.—Esther Willbrecht Margaret Strane, M.T.  
Miller Hospital  
St. Paul 2, Minnesota

**NEBRASKA**

Nebraska Society of M. T. National Annual  
Pres.—Romona Forbes Marjorie Lundeen  
Omaha-Council Bluffs Society None Bi-monthly  
Pres.—Rosemary McLennon Elsie Blazek, M.T. (ASCP)  
1469 So. Sixteenth St.  
Omaha, Nebraska

**NEW HAMPSHIRE**

New Hampshire Society None Annual Marion P. MacMartin, M.T.  
of M.T. Mary Hitchcock Mem. Hosp.  
Pres.—Sister Marie-Rose Hanover, New Hampshire  
(Larivee)

**NEW JERSEY**

New Jersey Society of M. T. None Annual Elsie Emmel, M.T.  
Pres.—Phyllis Stanley 304 Washington St.  
Glen Ridge, New Jersey

**NEW YORK**

Niagara Frontier Assn. National Monthly Alice Sprague, M.T.  
of M.T. 110 Merrimac  
Pres.—Margaret Moore Buffalo 14, New York

**OHIO**

Ohio Society of M. T. National Annual Mrs. Betty Mildren  
District 1 City Hospital  
Pres.—Lois Jane Scheffler Akron, Ohio

**OKLAHOMA**

Society Name	Chartered	Meetings	Secretary's Address
Oklahoma State Society of M.T.	National	Semi-annual	Hazel Clay, M.T. 514 North West 24th Street Oklahoma City 3, Okla.
Pres.—Oscar E. Stewart			Dorothy Foreman, M.T. Universal Hospital Oklahoma City, Oklahoma
Oklahoma City Society of M.T.	State	Monthly	Mrs. Eliz. Goltry Johnson 401 Medical Arts Bldg. Oklahoma City 2, Okla.
Pres.—Vernal Johnson			
Oklahoma Round Table of M.T.	State	Bi-monthly	
Pres.—H. L. Spencer			

### PENNSYLVANIA

Pennsylvania Society of M.T. Pres.—Elsa Lynch	National	Monthly	Ann Caverly, M.T. 5000 Pulaski Ave. Philadelphia 44, Pennsylvania
Western Pennsylvania Chapter of P. S. M.T. Pres.—Helen Brumbough	State	Monthly	Dorothy Flohr, M.T. 308 Lavina Ave. Mt. Lebanon, Pittsburgh

### TEXAS

Texas Society of M. T. Pres.—Margaret Davis	National	Annual	Miss Florence Petty Rusk, Texas
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### WASHINGTON

Inland Empire Society of M.T. Pres.—Frances Premo	None	Annual	Lenore De Vor East 547 Gordon Spokane, Washington
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### WISCONSIN

Wisconsin Association of M.T. Pres.—Alice A. Thorngate	National	Semi-annual	Mrs. Eliz. Kullman, M.T. 2460 So. 59th Street Milwaukee, Wisconsin
Wisconsin Association of M.T. Milwaukee District Pres.—Dorothy Zoeller	State	Monthly	Esther Lemont, M.T. 2618 North Summit Ave. Milwaukee, Wisconsin

### COUNTY SOCIETIES

Travis County Soc. of Medical Technologists (Austin)—Pres., Miss Frances Kelly, c/o Dr. H. J. Gondolf, Austin, Texas.

Tarrant County Society (Fort Worth)—Pres., Miss Ruby L. Oxford, 1805 Alston Ave., Fort Worth 4, Texas.

Harris County Society, Mary Nagai, President, Jefferson Davis Hospital, Houston, Texas.

CECELIA M. KORTUEM, R.N., M.T. (ASCP)

Editorial Staff

American Journal of Medical Technology

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